

REMARKS

In response to the Office Action mailed October 27, 2008, Applicants respectfully request reconsideration. Claims 1-8, 11, 26, 27, 29-36, 39, 54-83, 85-99, 101-115, 117 and 118 were previously pending in this application. By this amendment, Applicants are canceling Claims 99, 114, and 115 without prejudice or disclaimer. Claims 1, 29, 56, 57, 85, 98, and 101 have been amended. No new claims have been added. As a result, Claims 1-8, 11, 26, 27, 29-36, 39, 54, 55-83, 85-98, 101-113, 117 and 118 are pending for examination with Claims 1, 29, 56, 57, 85, 87, 92, 98, 101, 103, and 108 being independent. The application is believed to be in condition for allowance.

Allowable Subject Matter

Applicants note with appreciation the indication of allowance in Claims 87-97 and 103-113; and the allowable subject matter in Claims 68-78. Applicants note that Claims 68-78 have previously been rewritten in independent form.

Rejections under 35 U.S.C. §112

The Office Action rejects Claims 101, 102, 114 and 115 under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirements. Applicants have amended Claim 101 for the purpose of clarity. Claims 114 and 115 have been canceled since the elements of Claims 114 and 115 are already recited in Claims 101 and 102. Applicants respectfully assert that Claims 101 and 102 now comply with the written description requirement.

The Office Action rejects Claims 85, 86, 98 and 99 under 35 U.S.C. §112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. The Office Action further rejects Claims 101, 102, 114 and 115 under 35 U.S.C. §112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. Claims 85 and 98 have been amended to include “a polarization element configured to alter a polarization of the electromagnetic signals,” and 101 has been amended to include “altering a polarization of the electromagnetic signals.”

Applicants' respectfully assert that Claims 85, 98, 101, and 102 now include the essential elements which have been noted by the Office Action.

Rejections Under 35 U.S.C. §102

The Office Action rejects Claims 1, 3, 27, 29, 31, 55, 57, 59, 83, 117 and 118 under 35 U.S.C. §102(e) as being anticipated by Marom *et al.*, U.S. Patent No. 6,657,770 (Marom). Applicants respectfully traverse this rejection.

Marom illustrates a programmable optical demultiplexer capable of assigning individual optical channels in a WDM optical communications signal to a desired output port (abstract). In Figure 5 (relied upon by the Office Action) an example of the programmable optical demultiplexer is shown. A WDM signal enters the demultiplexer through an input port 510 and on to a lens 530 (aperture) as the light is collimated (e.g., made parallel with respect to one another), upon passing through lens 530, the incoming light is focused to a plane P5-2. The incoming light eventually passes through a lens 540 and onto a reflection grating 550. The reflection grating 550 serves to spatially separate the optical channels within the WDM signal (col. 4, lines 65-67). The separated optical channels thereafter pass through the lens 540 and onto an array of mirrors 560. Each optical channel is focused on a separate and tilt-able mirror element which is controlled via an electrical control signal 580 (col. 5, lines 5-9). Upon reflection via the arrayed mirrors, all of the optical channels are eventually collimated by a lens 530 (col. 5, lines 15-16). The collimated channels are thereafter placed in respective output ports 570.

Amended Claim 1 recites "...wavelength dependent deflectors deflecting respective electromagnetic signals of respective wavelengths at different respective wavelength dependent angles to simultaneously, dynamically and independently steer the electromagnetic signals *passing through the aperture structure in different wavelength dependent angular directions through free space to or from remote receiver or transmitter devices at different angular locations.*" Amended Claim 1 patentably distinguishes Marom for at least two reasons.

First, Marom fails to teach the electromagnetic signals *passing through the aperture structure in different wavelength dependent angular directions*. As shown in Figure 5, Marom instead teaches outgoing light passing through the aperture as *collimated light* 535 and incoming

light passing through the aperture as *focused light 508*. One of skill in the art would appreciate that collimated or focused light is not equivalent to electromagnetic signals *in different wavelength dependent* angular directions, as is recited in amended Claim 1.

Secondly, Marom fails to teach electromagnetic signals being passed *through free space* to or from remote devices at different angular directions. Marom instead teaches sending and receiving signals remotely through the use of an input port 510 and various output ports 570. Marom also describes the ports as typically being single mode optical fibers (col. 4, lines 25-28). Applicants respectfully assert that one of skill in the art would not find the use of ports equivalent to free space communications.

Thus, Amended Claim 1 patentably distinguishes Marom. Claims 3, 27, and 117 depend from amended Claim 1 and therefore patentably distinguish Marom for at least the same reasons.

As should be appreciated from the above description of amended Claim 1, amended Claim 29 (from which Claims 31, 55, and 118 depend) and amended Claim 57 (from which Claims 59 and 83 depend) also patentably distinguish Marom for at least the same reasons as amended Claim 1. Specifically, Marom fails to teach the electromagnetic signals *passing through the aperture structure in different wavelength dependent angular directions*, and also fails to teach electromagnetic signals being passed *through free space* to or from remote devices at *different angular locations*.

Rejections Under 35 U.S.C. §103

The Office Action rejects Claim 56 under 35 U.S.C. §103(a) as being unpatentable over Riley *et al.*, U.S. Patent No. 6,763,149 (Riley) in view of Rockwell, U.S. Patent No. 6,327,063 (Rockwell). The Office Action rejects Claims 1, 3-8, 11, 26, 27, 29, 31-36, 39, 54, 55, 57, 59-65, 67, 79, 80, 82, 83, 117 and 118 under 35 U.S.C. §103(a) as being unpatentable over Rockwell in view of Sakanaka, U.S. Patent No. 7,058,307 (Sakanaka) and in further view of Riley. The Office Action also rejects Claims 2, 30, 58 and 81 under 35 U.S.C. §103(a) as being unpatentable over Rockwell, Sakanaka, and as applied to Claims 1, 29 and 57 above, in further view of Rice, U.S. Patent No. 5,347,387 (Rice). The Office Action further rejects Claim 66 under 35 U.S.C. §103(a) as being unpatentable over Rockwell, Sakanaka, and Riley as applied to

Claims 57, 60-62 and 65 above, in further view of Huang *et al.*, U.S. Patent No. 6,643,064 (Huang). Applicants respectfully traverse these rejections.

Discussion of Riley and Rockwell in view of Claim 56:

Riley illustrates a method and apparatus for correcting crosstalk and spatial resolution for multi-channel imaging (abstract). In Figure 29 (relied upon by the Office Action), dichroic filters 266, 268, 270, and 272 are *statically placed* in a manner allowing reflected light to be directed toward imaging lenses 40a and 40b and then onto a detector 274, without passing through another dichroic filter after reflection (Col. 30, lines 36-51). In column 31, lines 12-15 (relied upon by the Office Action), Riley suggests that the angles or orientation of the filters may be adjusted to direct light of a given bandwidth onto any desired point on a detector.

Rockwell illustrates a system and method for free space communication (abstract). As shown in Figure 2, the device of Rockwell includes a fine-pointing mirror 62, a telescope 64, and a steering mirror 66 used for acquisition, tracking, and communications alignment purposes (col. 7, lines 57-60).

Applicants respectfully assert that the combination of Riley and Rockwell is improper. The Office Action asserts that it would have been obvious to one of skill to apply dynamic controlling as taught by Rockwell to the system of Riley so that the system of Riley can accurately track the movements of targets. Applicants respectfully disagree. In the embodiment relied on by the Office Action (shown in Figure 29), the target of Riley is a detector 274. Riley does not discuss the detector 274 as being in motion, therefore there is no need for the device of Riley to employ the use of tracking as taught by Rockwell. However, even if one of skill in the art were to modify the teachings of Riley with the teachings of Rockwell in the manner suggested by the Office Action (which Applicants' do not concede), the claims still patentably distinguish the combination.

Amended Claim 56 recites "...independently deflecting electromagnetic waves within a first wavelength band at a first dynamic angle and passing electromagnetic waves within a second wavelength band by a first deflector through a first pass; and independently deflecting electromagnetic waves within a second wavelength band, at a second dynamic angle independent of the first dynamic angle, by a second deflector, the second deflector positioned to receive the

electromagnetic waves passed through the first deflector and *passing the electromagnetic waves, deflected by the second deflector, through the first deflector through a second pass.*”

Neither Riley nor Rockwell teaches passing electromagnetic waves, deflected by a second deflector, through a first deflector through a second pass. Riley states that configuration of detectors shown in Figure 29 (relied upon by the Office Action) does not allow light to pass through another dichroic filter after reflection (col. 30, lines 36-38). Thus, the device of Riley does not allow light to pass through a single deflector more than once. Rockwell does not remedy the deficiency of Riley. Rockwell does not teach deflecting signals within a first wavelength band and twice passing signals within a second wavelength band with a first deflector.

Thus, amended Claim 56 patentably distinguishes the combination of Riley and Rockwell.

Discussion of Rockwell, Sakanaka, and Riley in view of Claims 1, 3-8, 11, 26, 27, 29, 31-36, 39, 54, 55, 57, 59-65, 67, 79, 80, 82, 83, 117 and 118:

Sakanaka illustrates a free-space optical communication apparatus including a storage unit which stores angle-setting information for a moveable mirror 24 configured to serially communicate with a plurality of other apparatuses 11a-c (abstract, Figure 1).

As previously stated, amended Claim 1 recites “... electromagnetic signals of respective wavelengths... *simultaneously*, dynamically and independently steer the electromagnetic signals passing through the aperture in *different* wavelength dependent angular directions...”

Of the three references relied upon, only Sakanaka teaches steering signals to multiple locations. However, the steering of Sakanaka is not wavelength dependent. Furthermore, Sakanaka only supports communication to a maximum of one location at any point in time. Meanwhile, our claims support simultaneous communication to multiple and dynamically-moving locations at any point in time. Sakanaka does not teach a *simultaneous* and *independent* steering of *different* signals in *different* angular directions. In fact, all three relied upon references are silent as to the *simultaneous* and *independent* steering of *different* signals in *different* angular directions.

Thus, amended Claim 1 patentably distinguishes the combination of Rockwell, Sakanaka, and Riley. Claims 3-8, 11, 26, 27, and 117 depend from amended Claim 1 and therefore

patentably distinguish the combination of Rockwell, Sakanaka, and Riley for at least the same reasons.

As should be appreciated from the above description of amended Claim 1, amended Claim 29 (from which Claims 31-36, 39, 54, 55, and 118 depend), and amended Claim 57 (from which Claims 59-65, 67, 79, 80, 82, and 83 depend) patentably distinguish the combination of Rockwell, Sakanaka, and Riley. Specifically, the combination of Rockwell, Sakanaka, and Riley fails to teach a *simultaneous* and *independent* steering of *different* signals in *different* angular directions. In fact, all three relied upon references are silent as to the *simultaneous* and *independent* steering of *different* signals in *different* angular directions.

Discussion of Rockwell, Sakanaka, and Rice in view of Claims 2, 30, 58, and 81:

Claim 2 depends from amended Claim 1, Claim 30 depends from amended Claim 29, Claims 58 and 81 depend from amended Claim 57. Thus, Claims 2, 30, 58, and 81 patentably distinguish the relied upon prior art for at least the same reasons as their respective independent claims.

Discussion of Rockwell, Sakanaka, Riley, and Huang in view of Claim 66:

Claim 66 depends from amended Claim 57. Thus, Claim 66 patentably distinguishes the relied upon prior art for at least the same reasons.

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

HAMILTON, BROOK, SMITH & REYNOLDS, P.C.

By 

James M. Smith

Registration No. 28,043

Telephone: (978) 341-0036

Facsimile: (978) 341-0136

Concord, MA 01742-9133

Date: 